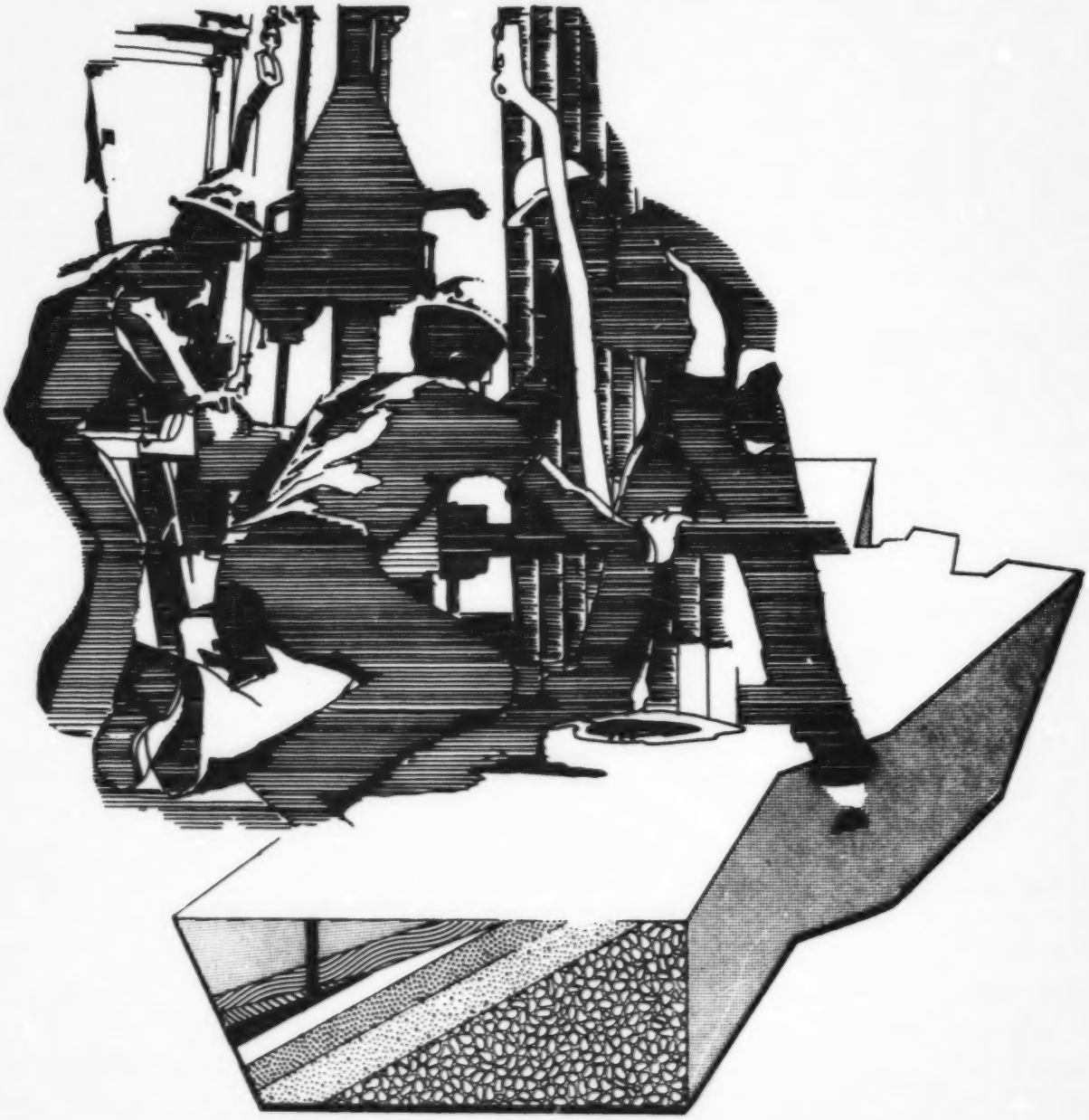
OIL ACTIVITY REVIEW 1990



Manitoba
Energy and Mines
Petroleum

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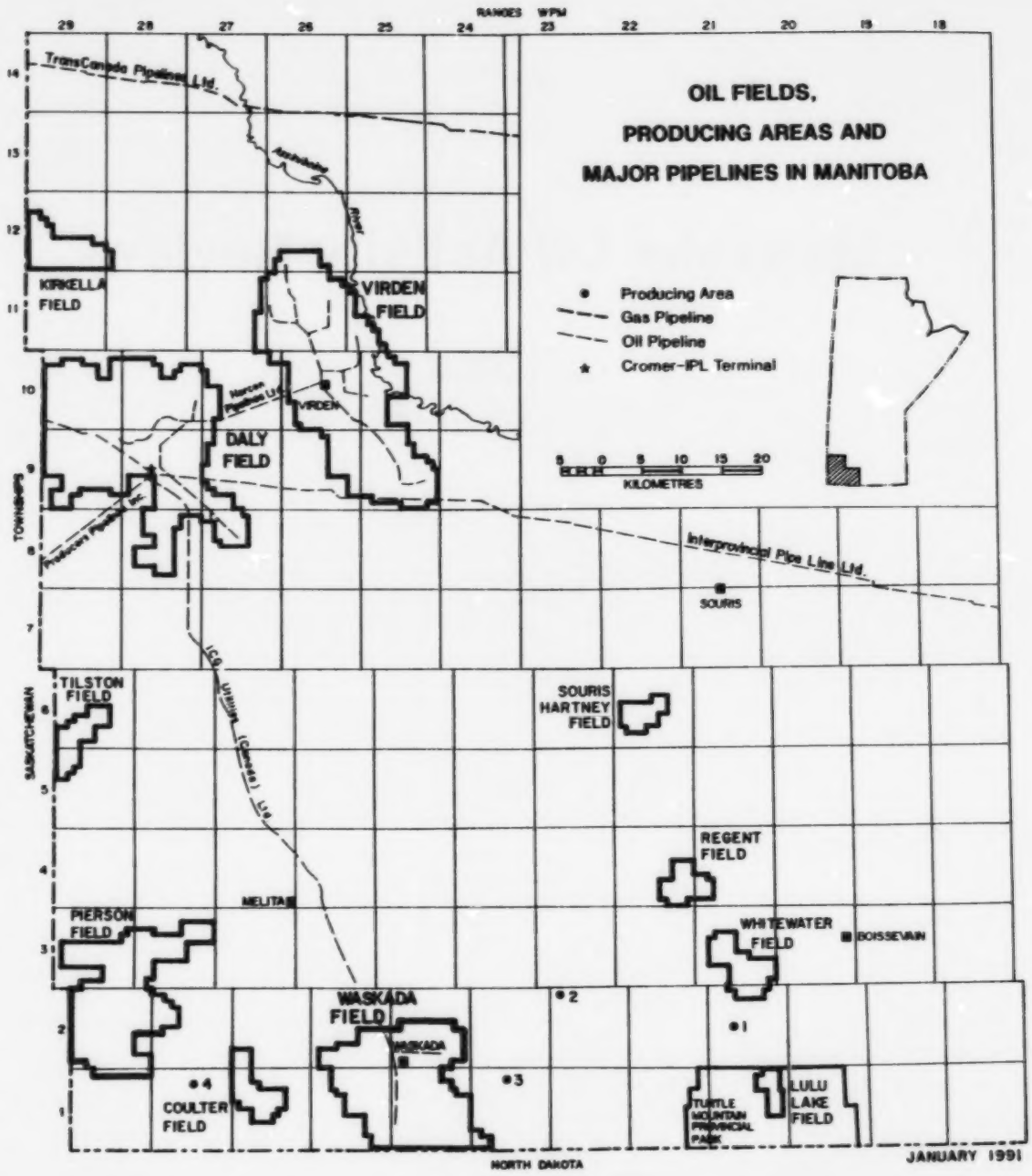
Manitoba Oil Activity Review

1990

April, 1991



OTHER PRODUCING AREAS

1. Mountainside
2. Deloraine
3. Goodlands
4. Lyleton

1990 Highlights

- During 1990, 79 wells were drilled in Manitoba, a 52% increase from over 1989's total of 52 wells.
- Manitoba's annual oil production was up approximately 2% from 1989 production to 737 762 m^3.
- The value of oil produced increased to approximately $114.8 million, a 27% increase over 1989.
- Provincial revenues from the oil industry (royalties, oil taxes, lease sales and lease rentals) increased to $11.0 million during 1990, representing a 17% increase from 1989 ($9.4 million).
- Gross royalties payable to freehold mineral owners were estimated to be $12.7 million in 1990 (Federal and Provincial tax liabilities included).
- Surface rights owners received approximately $3.5 million from rental payments during 1990.
- Municipal tax assessments on oilfield equipment and pipelines were estimated to be $51.5 million (with taxes paid amounting to approximately $2.4 million).
- Oil industry expenditures in Manitoba were estimated to be $76 million in 1990, a 22% increase over 1989.
- Two geophysical programs were licensed in 1990, covering 37 kilometres at a cost of $118,452.
- Two sales of Crown oil leases and exploration reservations covering 5 616 hectares generated $172,291 in revenue to the province in 1990, down 28 percent from the 1989 total of $240,548.
- As of December 31, 1990 there were 12 oil fields and 117 non-confidential oil pools designated in the province.
- Crude oil prices fluctuated throughout the year between $16 - 38/bbl. In 1990, Manitoba's average crude oil price increased by 25% to $24.78/bbl, compared with 1989's average of $19.82/bbl.
- Manitoba Energy and Mines announced a special temporary incentive designed to assist operators in demonstrating the applicability of horizontal drilling in Manitoba.

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Manitoba Crown Oil Lease and Reservation Sale Statistics 1947 - 1990

Year	Lease Sales: No. of Leases Sold	Lease Sales: Area (ha)	Lease Sales: Bonus ($)	Lease Sales: Avg. Price ($/ha)	Lease Sales: Highest Price ($/ha)	Lease Sales: Lease Revenue ($)	Reservation Sales: No. of Res. Sold	Reservation Sales: Area (ha)	Reservation Sales: Bonus ($)	Reservation Sales: Avg. Price ($/ha)	Reservation Sales: Highest Price ($/ha)	Reservation Sales: Res Revenue ($)	Total Revenue from Sales ($)
1947-53			DATA UNAVAILABLE										
1954	31	4 184	82,814	19.79	37.37	88,291	0	0	0	0.00	0.00	0	88,291
1955	140	32 247	579,801	17.98	62.58	620,751	1	8 778	5,854	0.67	0.67	6,213	626,964
1956	28	4 534	43,902	9.68	79.09	49,682	4	255 016	105,587	0.41	1.33	106,587	156,269
1957	16	4 568	100,373	21.97	44.71	106,174	2	48 820	3,256	0.07	0.08	3,756	109,931
1958	0	0	0	0.00	0.00	0	1	10 291	101	0.01	0.01	351	351
1959	1	777	505	0.65	0.65	1,475	2	11 478	11,879	1.03	2.42	12,379	13,854
1960	1	65	4,103	63.12	63.12	4,193	0	0	0	0.00	0.00	0	4,193
1961	0	0	0	0.00	0.00	0	4	50 721	134,099	2.64	6.75	135,099	135,099
1962	2	260	1,327	5.11	12.62	1,668	1	7 464	24,706	3.31	3.31	24,956	26,624
1963	63	5 055	31,614	6.25	17.30	38,468	1	3 498	1,608	0.46	0.46	1,858	40,326
1964	40	9 467	109,125	28.47	388.06	120,717	1	5 641	778	0.14	0.14	1,028	121,745
1965	42	4 347	40,235	9.26	77.60	46,024	15	92 717	52,672	0.57	12.11	56,422	102,446
1966	31	4 417	24,086	5.45	64.22	29,850	6	38 689	62,886	1.63	2.08	64,636	94,485
1967	10	2 274	23,537	10.35	22.25	26,446	5	49 846	55,013	1.10	3.80	56,263	82,709
1968	19	3 599	22,630	6.29	18.92	27,265	6	46 040	31,426	0.68	4.45	32,926	60,191
1969	2	970	7,164	7.39	11.94	8,382	3	16 453	75,282	4.58	7.54	76,032	84,414
1970	8	3 580	10,094	2.82	8.08	14,596	0	0	0	0.00	0.00	0	14,596
1971	2	1 230	33,673	27.38	49.75	34,308	0	0	0	0.00	0.00	0	34,308
1972-78			NO SALES										
1979	86	11 064	897,885	81.15	315.17	929,855	3	4 736	40,888	8.63	12.23	47,558	977,413
1980	80	12 540	1,057,530	84.33	470.51	1,092,880	8	15 572	820,345	52.68	100.31	841,810	1,934,690
1981	85	12 312	1,074,958	87.31	257.26	1,109,988	5	5 376	611,199	113.69	178.43	619,169	1,729,157
1982	56	6 448	1,055,668	163.72	938.88	1,074,588	0	0	0	0.00	0.00	0	1,074,588
1983	66	9 255	1,032,267	111.54	762.34	1,058,705	1	1 024	40,192	39.25	39.25	41,722	1,100,427
1984	104	8 776	2,181,499	248.58	1,411.17	2,208,639	0	0	0	0.00	0.00	0	2,208,639
1985	173	15 471	4,215,083	272.45	1,593.78	4,262,410	0	0	0	0.00	0.00	0	4,262,410
1986	103	7 904	891,358	112.77	602.00	916,268	1	768	20,285	26.41	26.41	21,495	937,763
1987	57	5 813	577,253	99.30	230.23	594,635	0	0	0	0.00	0.00	0	594,635
1988	29	3 429	348,439	101.62	313.07	358,462	1	2 112	84,231	39.88	39.88	87,121	445,583
1989	31	2 832	231,918	81.89	400.17	240,548	0	0	0	0.00	0.00	0	240,548
1990	20	1 488	111,930	75.22	250.00	116,650	3	4 128	49,731	12.05	21.33	55,641	172,291
Total	**1 326**	**178 906**	**14,790,771**	**82.67**	**N/A**	**15,181,918**	**74**	**679 168**	**2,232,018**	**3.29**	**N/A**	**2,293,022**	**17,474,940**

Crown Oil and Natural Gas Lease Sales

Two Crown oil and natural gas lease sales were held in 1990. Twenty leases covering 1 488 hectares were sold for a total of $116,650 down 52% from 1989 lease revenue total of $240,548.

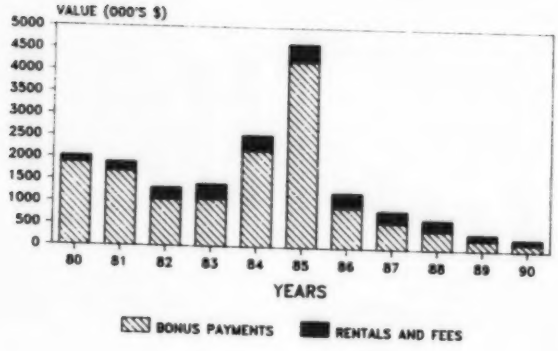
In the first lease sale, held on April 25, 1990, the average lease bonus price paid per hectare was $82.98, whereas in the November 7, 1990 sale, the average lease bonus price decreased oy 24% to $63.47 per hectare. Compared with the two sales held in 1989, the average lease bonus price in 1990 decreased by 8%, from $81.89 to $75.22/hectare.

Three exploration reservations were sold at the November 7, 1990 sale. The reservations covered 4 128 hectares and garnered total revenue of $55,641.

Lease sales in 1990 generated the lowest revenue since lease sales were re-implemented in 1979.

Since Crown oil and gas lease sales resumed in 1979, the province has received $15,678,144 in revenue from the disposition of Crown oil leases and exploration reservations (refer to table for annual sale statistics).

CROWN LEASE SALES
1980-1990



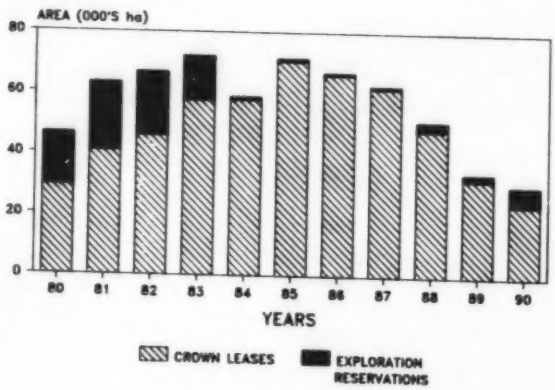
Crown Oil and Natural Gas Leases

As of December 31, 1990, the total area of Crown oil and natural gas rights under disposition was 30 081 hectares. Of this total, 23 841 hectares were held under lease and 6 240 hectares were held under exploration reservations. In 1990 the total area under disposition decreased by 11 percent compared with 1989.

On December 31, 1982, deeper rights renewal provisions came into effect for pre-1979 leases. Under these provisions, non-productive areas and rights below the producing formation revert to the Crown at the end of the lease term. These cancelled rights again become available for leasing by other parties interested in actively developing them.

Oil and natural gas leases have initial terms of five years. Because eleven years have passed since lease sales were resumed in 1979, 1990 was the seventh year that post-1978 lease holders had to surrender non-productive leases or apply for one-year extensions by paying additional rental penalties and committing to drilling programs. As a result, those leases surrendered will again be made available to other interested parties.

CROWN OIL AND GAS RIGHTS
UNDER DISPOSITION (DEC. 31ST) 1980-1990



Freehold Mineral Owner's Leasing and Revenue

Approximately 80% of the mineral rights in southwestern Manitoba are privately owned (freehold). There is keen competition among companies to negotiate new leases with freehold mineral owners in areas of current interest where leases have expired or where mineral rights are not presently leased. Freehold mineral owners receive revenue from signing bonuses, delay rental payments and oil royalties when production is obtained. Freehold royalties may range from 12 1/2 to 20% of gross production sales value. It is estimated that gross royalties payable to freehold mineral owners in 1990 were $12.7 million (not including signing bonuses and delay rental payments for new and non-producing leases and before payment of provincial and federal taxes).

Geophysical Activity

Two geophysical licenses were issued in 1990. The licensed programs covered 37 km. The estimated cost of these programs was $118,452.

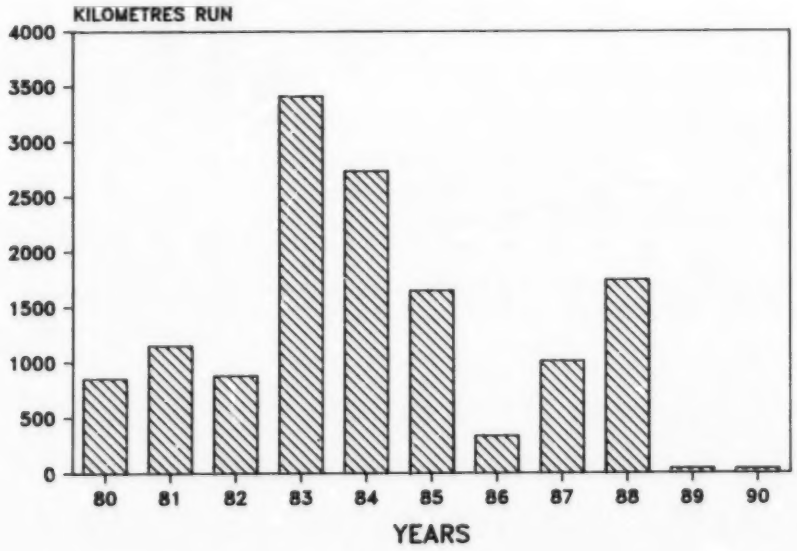
This expenditure level is 3.3 percent higher than 1989.

The two programs were carried out in the Virden and Coulter areas.

Manitoba Geophysical Activity Summary 1973-1990

Year	Licenses Issued	Kliometres Run (km)	Total Program Costs $
1973	0	0	0
1974	0	0	0
1975	1	270	106,500
1976	3	112	118,302
1977	2	830	1,046,220
1978	5	1 828	3,451,370
1979	10	2 001	2,970,734
1980	10	851	1,843,438
1981	11	1 148	2,116,854
1982	19	879	1,805,512
1983	14	3 410	3,639,692
1984	23	2 731	5,547,086
1985	25	1 647	3,081,241
1986	8	338	1,227,227
1987	13	683	2,713,000
1988	13	2 148	2,129,550
1989	2	39	114,627
1990	2	30	118,452

GEOPHYSICAL ACTIVITY 1980-1990



Summary of 1990 Geophysical Programs

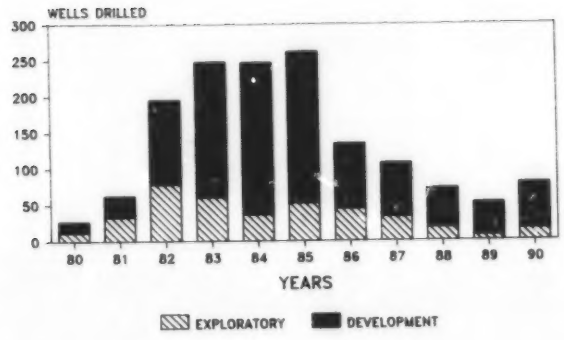
Geophysical License No.	Licensee	Contractor	Km Licensed
301	Home Oil Company Limited	Format Resources Corporation	30.0
302	Chevron Canada Resources	Venture Siesmic Ltd.	6.5
Total			**36.5**

Drilling Activity

Drilling activity in Manitoba was up significantly over 1989. In 1990, 93 drilling licenses were issued, resulting in 8 different companies drilling 79 wells (52% higher than 1989). Four drilling contractors drilled 75 751 metres of hole. Of the 79 wells drilled, 63 were classified as development wells, 16 were exploratory and one was a service well.

The success rate of wells drilled continued to be high. Eighty-nine percent (70 wells) of the 79 wells drilled were completed as potential oil wells. Ninety-four per cent of the 63 development wells drilled and seventy-three percent of the 15 exploratory wells drilled were completed as potential oil wells.

WELLS DRILLED IN MANITOBA 1980-1990



Areas of Activity

Waskada

The Waskada Field was the most active area in the province with 37 wells being drilled. Significant development in the east and north-east parts of the field continued.

Daly

Limited drilling continued in the northern and western parts of the Daly Field with eight wells being drilled. Both Bakken and Lodgepole pools continue to be developed.

South Pierson

Delineation of significant reserves in the Lower Amaranth and Mission Canyon Formations in the South Pierson Field (located in the extreme southwest corner of the Province) resumed with 23 wells being drilled.

1990 New Field Wildcat Well Cased for Production

Location	Operator
Lyleton Area 3-24-1-28	Enron Oil Canada Ltd.

1990 Drilling Statistics

Wells Drilled by Operator

	1990	1989
Enron Oil Canada Ltd.	33	15
Home Oil Company Limited	20	1
Tundra Oil and Gas Ltd.	12	10
Omega Hydrocarbons Ltd.	10	6
Antler River Resources Ltd.	1	--
Chevron Canada Resources Limited	1	16
Rideau Petroleums Ltd.	1	--
Canadian Occidental Chemicals Ltd.	1	--
Total	**79**	**--**

Wells Drilled by Contractor

	1989	1988
Big Sky Drilling Ltd.	38	--
Simmons Drilling Ltd.	22	11
Precision Drilling Ltd.	10	--
Crown Drilling Ltd.	9	22
Total	**79**	**--**

1990 Drilling Activity by Area

Field	TWP	RGE WPM	# Of Wells Drld.	Development Drld.	Development POW	Exploration Drld.	Exploration POW	Total POW	Dry/ Abd	Other
Daly	8-10	27-29	8	8	6	--	--	6	2	--
Tilston	5/6	29	--	--	--	--	--	--	--	--
Waskada	1/2	25/26	37	36	34	1	1	35	2	--
Lulu Lake	1	21	--	--	--	--	--	--	--	--
Virden	9-12	25-27	1	--	--	1	--	--	1	--
Whitewater	2/3	21	--	--	--	--	--	--	--	--
Pierson	2/3	28/29	1	--	--	1	1	1	--	--
Kirkella	12	29	--	--	--	--	--	--	--	--
Souris Hartney	6	22	--	--	--	--	--	--	--	--
Coulter	1	27	--	--	--	--	--	--	--	--
S. Pierson	2	28/29	23	17	17	6	6	23	--	--
Regent	4	22	--	--	--	--	--	--	--	--
Other Areas			9	2	2	7	3	5	3	1
Total			**79**	**63**	**59**	**15**	**11**	**70**	**8**	**1**
% of Total Drilled		--			80		19	89	10	1
Success Rate			--		94%		73%	--	--	--

POW = Potential Oil Wells

Drilling Activity 1951-1990

Year	Wells Licensed	Wells* Drilled	Oil and Gas Wells: Well Classification E	Oil and Gas Wells: Well Classification D	Oil and Gas Wells: Completed Status Potential Oil	Oil and Gas Wells: Completed Status Abandoned Dry	Oil and Gas Wells: Completed Status Service	Metres Drilled	Other Wells Drilled: STH	Other Wells Drilled: PTH	Other Wells Drilled: GSW	Other Wells Drilled: Helium
Pre 1951	15											
1951	123	18	14	4	6	10	2	14 956	103	0	0	0
1952	104	68	40	28	25	33	10	58 344	33	0	0	0
1953	127	102	31	71	73	29	0	76 682	9	0	0	0
1954	333	310	114	196	217	90	3	233 170	0	0	0	0
1955	382	354	57	297	279	66	9	254 774	5	0	0	0
1956	283	248	30	218	202	38	8	176 994	14	0	0	0
1957	225	224	71	153	139	85	0	155 469	2	0	0	0
1958	92	92	16	76	61	31	0	60 430	0	0	0	0
1959	50	47	16	31	30	17	0	30 792	0	2	0	0
1960	65	66	12	54	50	15	1	43 918	0	0	0	0
1961	26	28	11	17	11	16	1	17 389	0	1	0	0
1962	30	24	3	21	15	9	0	17 683	0	0	0	2
1963	59	57	9	48	39	16	2	43 451	0	0	0	0
1964	110	104	32	72	68	35	1	75 303	0	3	0	0
1965	79	65	40	25	27	38	0	50 298	2	8	0	0
1966	76	63	33	30	29	33	1	54 863	5	4	0	0
1967	90	85	42	43	44	41	0	67 068	0	0	0	0
1968	64	59	44	15	27	32	0	48 840	2	0	1	0
1969	98	46	30	16	14	29	3	34 376	38	0	0	0
1970	18	18	13	5	2	16	0	16 253	1	0	0	0
1971	24	15	6	9	2	8	5	13 026	6	0	0	0
1972	11	9	6	3	0	7	2	6 778	1	0	0	0
1973	19	17	17	0	0	17	0	14 083	0	0	0	0
1974	22	21	17	4	6	14	1	22 710	1	0	0	0
1975	9	7	7	0	2	4	1	6 717	4	0	0	0
1976	16	14	13	1	3	11	1	11 161	0	0	2	0
1977	21	11	10	1	9	2	0	9 359	0	0	2	0
1978	16	22	12	10	10	6	6	18 329	0	0	0	0
1979	27	25	9	16	16	9	0	20 537	0	0	0	0
1980	33	27	12	15	18	9	0	23 508	0	6	0	0
1981	76	62	33	29	47	15	0	61 011	0	5	0	0
1982	201	195	78	117	164	30	1	184 282	0	0	0	0
1983	290	247	60	187	223	24	0	229 304	0	5	0	0
1984	249	246	36	210	218	28	0	220 631	0	0	0	0
1985	313	268	52	209	229	29	3	228 387	7	0	0	0
1986	116	135	44	90	122	11	1	118 675	0	1	0	0
1987	116	107	33	74	90	17	0	96 970	0	0	0	0
1988	78	72	18	54	48	23	1	63 722	0	0	0	0
1989	54	52	7	45	44	8	0	42 948	0	0	0	0
1990	93	79	16	63	70	8	1	75 751	0	0	0	0
TOTAL	4 233	3 709	1 144	2 557	2 679	959	64	2 998 942	233	35	5	2

*Includes other wells drilled

1990 Monthly Summary of Drilling Activity

Month	Licenses Issued	Rigs Operated	Wells Drilled			Metres Drilled		
			Develop.	Exploratory	Total	Develop.	Exploratory	Total
January	1	--	--	--	--	-	---	--
February	22	3	10	1	11	8 983	540	9 523
March	5	4	11	3	14	10 633	3 205	13 838
April	1	1	1	1	2	1 075	1 075	2 150
May	18	2	3	2	5	2 990	2 047	5 037
June	8	2	7	3	10	6 971	2 988	9 959
July	4	2	13	1	14	12 871	1 075	13 946
August	6	1	1	1	2	834	1 050	1 884
September	5	1	5	1	6	4 511	1 016	5 527
October	16	2	8	1	9	7 462	1 050	8 512
November	5	1	4	1	5	3 727	975	4 702
December	2	1	--	1	1	--	673	673
Total	**93**		**63**	**16**	**79**			**75 751**

Drilling Success Percentages
1981-1990

Year	Development Wells		Exploratory Wells		All Wells	
	Drilled	% Successful	Drilled	% Successful	Drilled	% Successful
1981	29	100	33	55	62	76
1982	117	95	78	67	195	84
1983	187	95	60	77	247	91
1984	210	95	36	44	246	88
1985	209	92	52	69	261	87
1986	90	95	43	91	133	93
1987	74	93	33	61	107	83
1988	53	85	18	17	71	68
1989	45	96	7	14	52	85
1990	63	94	15	73	78	90

Exploratory* Wells Drilled in Manitoba by Formation 1974 - 1990

	(Geological Period of Formation Drilled into)								
Year	**Cretaceous**	**Jurassic**	**Mississippian**	**Devonian**	**Silurian**	**Ordovician**	**Cambrian**	**Precambrian**	**Total**
1974	1	--	5	--	--	--	--	12	18
1975	1	--	4	1	--	4	--	1	11
1976	-	--	5	7	--	--	--	--	12
1977	-	--	10	-	--	--	--	--	10
1978	-	--	9	1	--	1	--	1	12
1979	-	--	6	1	--	--	--	2	9
1980	-	--	8	1	1	--	--	1	11
1981	-	--	21	6	--	--	--	5	32
1982	-	--	72	5	--	--	--	1	78
1983	-	1	48	9	1	--	--	1	60
1984	1	--	32	2	--	--	--	1	36
1985	-	--	49	2	--	--	--	1	52
1986	-	--	30	13	--	--	--	--	43
1987	-	--	13	19	1	--	--	--	33
1988	3	--	9	6	--	--	--	--	18
1989	--	1	2	3	1	--	--	--	7
1990	--	--	15	--	--	--	--	--	15
Total	**6**	**2**	**338**	**76**	**4**	**5**	**--**	**26**	**457**

* Exploratory - includes outpost, new field wildcat, new pool wildcat and deeper pool wildcat classifications.

Non-Abandoned Wells (1990)

Field[3]	Active[1] Oil Producers	Inactive Oil Producers	Active[2] Other Wells	Inactive[2] Other Wells	Total Non-Abandoned Wells
Daly	370	26	46	8	450
Tilston	16	0	2	1	19
Waskada	346	23	92	4	465
Lulu Lake	6	0	1	0	7
Virden	553	17	148	5	723
Whitewater	26	1	1	2	30
Pierson	50	3	5	1	59
Kirkella	27	7	4	1	39
Souris Hartney	6	1	1	0	8
Coulter	5	3	0	0	8
South Pierson	42	5	2	1	50
Regent	10	1	1	0	12
Other Areas	15	1	4	3	23
Confidential Wells	13	0	0	0	13
Total	**1 485**	**88**	**307**	**26**	**1 906**

Notes:

(1) Non-abandoned wells which produced oil in 1990.
Dual or commingled wells count as one well.

(2) Includes Water Injection, Salt Water Disposal, Water Supply, Gas Injection and Other Wells.

(3) Based on 1990 Field designations.

Production and Markets

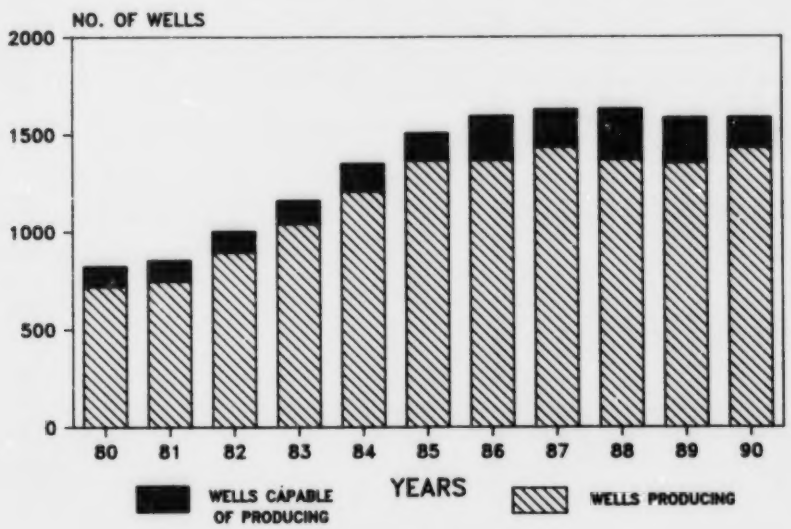
Annual oil production in Manitoba was 737 762 m^3 (4.6 million barrels), representing a 2.1% increase from 1989. During December 1990 the Province had 1 430 oil wells producing.

Oil production from the Virden, Waskada and Daly Fields accounted for 40%, 26% and 18% respectively of Manitoba's total production. The Waskada Field experienced the largest increase in oil production over 1989 (12 068 m^3 or 6.6%).

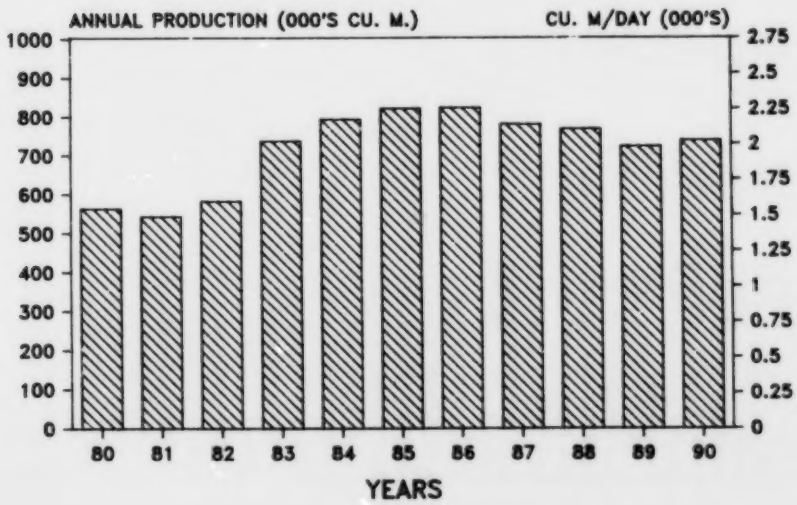
A major production increase also occurred in the South Pierson Field (11 018 m^3 or 34%). The Virden, Souris Hartney and Coulter Fields also posted small gains in oil production in 1990.

Of the total amount of oil purchased by refiners, approximately 50% was refined in Ontario, 49% went to refineries in the United States and only 1% was utilized by refineries in Quebec..

PRODUCING OIL WELLS IN MANITOBA
1980-1990



MANITOBA CRUDE OIL PRODUCTION
1980-1990



1990 Monthly Oil Production by Field (m^3)

Field	January	February	March	April	May	June	July	August	September	October	November	December	Total
Daly	12 252.6	10 638.2	11 716.7	10 888.9	11 022.1	11 164.3	11 542.8	11 315.7	11 075.6	11 982.2	11 489.0	11 610.0	**136 698.1**
Tilston	400.6	324.9	333.2	315.9	320.7	355.5	324.9	355.2	315.5	322.9	315.1	284.3	**3 968.7**
Waskada	16 293.1	14 011.0	17 184.8	16 755.2	16 602.3	16 163.7	17 136.5	16 554.2	16 018.8	16 501.4	16 514.0	16 210.0	**195 945.0**
Lulu Lake	194.5	220.6	232.2	218.0	222.2	198.3	208.4	193.7	155.5	168.0	192.8	198.5	**2 402.7**
Virden	26 002.7	23 658.3	26 111.1	24 068.6	24 696.6	24 370.1	24 854.9	24 560.8	24 072.6	24 790.2	24 364.1	25 139.2	**296 689.2**
Whitewater	994.4	936.0	1 088.1	1 036.3	1 218.6	1 000.4	1 050.7	1 067.6	996.3	996.7	1 021.1	967.3	**12 373.5**
Pierson	1 713.4	1 573.1	1 685.6	1 468.6	1 622.7	1 633.6	1 657.8	1 754.4	1 688.5	1 726.0	1 562.8	1 623.2	**19 709.7**
Kirkella	748.8	627.2	662.6	610.9	637.7	595.8	625.4	625.8	725.9	760.4	795.2	796.2	**8 211.9**
Souris Hartney	199.9	180.0	192.7	167.1	192.7	158.8	155.5	196.5	183.5	160.6	163.8	158.5	**2 109.6**
Coulter	56.5	40.0	55.8	47.5	40.2	52.4	47.9	40.2	50.6	50.3	41.8	44.8	**568.0**
South Pierson	2 596.1	2 578.5	2 874.7	2 526.5	3 432.9	3 736.0	3 970.6	4 225.7	4 404.5	4 400.1	4 093.9	4 039.5	**42 879.0**
Regent	372.6	343.7	360.2	310.7	370.6	374.1	379.4	341.5	331.3	316.9	301.2	303.7	**4 105.9**
Other Areas	757.5	654.6	540.9	534.2	536.4	524.2	590.2	666.9	587.5	629.6	627.1	582.0	**7 231.1**
Conf. Wells	--	--	164.7	216.7	312.0	291.7	565.7	616.5	630.8	724.1	911.1	436.8	**4 870.1**
Total	**62 582.7**	**55 786.1**	**63 203.3**	**59 165.1**	**61 227.7**	**60 618.9**	**63 110.7**	**62 514.7**	**61 236.9**	**63 529.4**	**62 393.0**	**62 394.0**	**737 762.5**

Oil Production by Operator 1990 vs 1989

Field	1990 m^3	1990 % of Total	1989 m^3	1989 % of Total	Change 1990/1989 increase/(decrease) m^3	Change 1990/1989 increase/(decrease) % Change
Chevron Canada Resources	320 916.7	43.4	313 819.9	43.4	7 096.8	2.3
Omega Hydrocarbons Ltd.	111 935.3	15.2	122 650.5	17.0	(10 715.2)	(8.7)
Enron Oil Canada Ltd.	68 099.0	9.2	44 299.1	6.1	23 799.9	53.7
Tundra Oil and Gas Ltd.	49 781.4	6.7	45 809.1	6.3	3 972.3	8.7
Home Oil Company Limited	35 849.4	4.8	24 877.9	3.4	10 971.5	44.1
Rideau Petroleums Ltd.	16 715.5	2.3	18 265.4	2.5	(1 549.9)	(8.5)
Newscope Resources Limited	16 577.5	2.2	18 507.4	2.6	(1 929.9)	(10.4)
Canada Northwest Energy Limited	16 356.8	2.2	20 913.1	2.9	(4 556.3)	(21.8)
International Interlake Industries Inc.	14 761.8	2.0	17 742.0	2.4	(2 980.2)	(16.8)
Canadian Roxy Petroleum Ltd.	14 469.2	2.0	17 243.2	2.4	(2 774.0	(16.1)
Geolock Resources Ltd.	7 182.9	1.0	--	--	7 182.9	--
Assiniboine Developments Ltd.	7 066.8	1.0	8 202.3	1.1	(1 135.5)	(13.8)
Lyleton Corporation	5 833.3	0.8	6 428.1	0.9	(594.8)	(9.2)
Mead Petroleums and Farms Ltd.	5 548.6	0.8	6 526.2	0.9	(977.6)	(15.0)
ICG Resources Ltd.	4 488.9	0.6	5 080.5	0.7	(591.6)	(11.6)
Murphy Oil Company Ltd.	4 279.3	0.6	3 743.8	0.5	535.5	14.3
Esso Resouces Canada	4 108.7	0.6	3 981.4	0.6	127.3	3.2
Ranchmen's Resources Ltd.	3 605.0	0.5	3 735.8	0.5	(130.8)	(3.5)
Can Tex Drilling and Exploration Ltd.	3 214.5	0.4	3 323.0	0.4	(108.5)	(3.3)
Saskatchewan Oil and Gas Corporation	2 524.6	0.3	3 771.8	0.5	(1 247.2)	(33.1)
Centoba Oils Ltd.	2 205.7	0.3	637.2	0.1	1 568.5	246.2
Upton Resources Inc.	1 954.5	0.3	2 073.2	0.3	(118.7)	(5.7)
Trilogy Resource Corporation	1 945.6	0.3	1 975.4	0.3	(29.8)	(1.5)
Triton Petroleum Limited	1 711.4	0.2	1 694.8	0.2	16.6	1.0
Dome Petroleums Limited	1 671.1	0.2	1 559.9	0.2	111.2	7.1
Confidential	4 870.1	0.7	5 243.7	0.7	(373.6)	(7.1)
Other	10 088.9	1.4	20 715.9	2.9	(10 627.0)	(51.3)
Total	**737 762.5**	**100.0**	**722 820.3**	**100.0**	**14 492.2**	**2.1**

Manitoba Oil and Water Production
1951-1989

Year	Wells Capable of Producing (December)	Wells Producing (December)	Oil Production (m^3)	Water Production (m^3)	Total Fluid Production (m^3)	Avg. Water Cut (%)	Avg. Oil Production (m^3/day)
1951	5	5	1 854	152	2 006	7.6	5.1
1952	39	32	17 022	4 068	21 090	19.3	46.6
1953	105	93	104 193	50 614	154 807	32.7	285.5
1954	284	269	341 410	112 226	453 636	24.7	935.4
1955	554	486	658 802	160 092	818 894	19.5	1 804.9
1956	736	647	919 539	754 908	1 674 447	45.1	2 519.3
1957	846	739	967 721	1 709 792	2 677 513	63.9	2 651.3
1958	877	736	926 322	1 183 122	2 109 444	56.1	2 537.9
1959	875	730	803 461	1 273 632	2 077 093	61.3	2 201.3
1960	893	755	757 054	1 400 880	2 157 934	64.9	2 074.1
1961	874	729	711 969	1 510 627	2 222 596	68.0	1 950.6
1962	852	730	623 989	1 549 430	2 173 419	71.3	1 709.6
1963	839	683	599 212	1 550 287	2 149 499	72.1	1 641.7
1964	892	745	701 920	1 752 708	2 454 628	71.4	1 923.1
1965	889	748	786 050	2 004 068	2 790 118	71.8	2 153.6
1966	905	737	831 248	2 162 719	2 993 967	72.2	2 277.4
1967	911	752	887 572	2 288 271	3 175 843	72.1	2 431.7
1968	926	774	986 024	2 839 697	3 825 721	74.2	2 701.4
1969	923	754	985 981	3 091 398	4 077 379	75.8	2 701.3
1970	904	730	939 175	3 105 414	4 044 589	76.8	2 573.1
1971	900	695	890 622	3 463 885	4 354 507	79.5	2 440.1
1972	891	745	835 380	3 744 738	4 580 118	81.8	2 288.7
1973	882	687	807 882	3 983 740	4 791 622	83.1	2 213.4
1974	871	714	754 667	3 992 698	4 747 365	84.1	2 067.6
1975	831	686	701 459	3 975 389	4 676 848	85.0	1 921.8
1976	821	688	633 322	4 020 078	4 653 400	86.4	1 735.1
1977	804	701	630 466	4 226 135	4 856 601	87.0	1 727.3
1978	808	703	598 354	4 073 299	4 671 653	87.2	1 639.3
1979	811	706	583 377	3 946 337	4 529 714	87.1	1 598.3
1980	823	720	563 482	4 171 099	4 734 581	88.1	1 543.8
1981	853	748	542 695	4 565 210	5 107 905	89.4	1 486.8
1982	1 002	896	582 283	4 582 081	5 164 364	88.7	1 595.1
1983	1 160	1 041	736 934	5 079 646	5 816 580	87.3	2 019.0
1984	1 350	1 209	793 286	5 575 632	6 368 918	87.5	2 173.4
1985	1 505	1 366	820 729	5 685 409	6 506 138	87.4	2 248.6
1986	1 592	1 367	823 322	6 506 138	7 329 460	88.8	2 255.7
1987	1 624	1 434	781 806	6 317 251	7 099 057	89.0	2 141.9
1988	1 627	1 370	768 563	6 601 841	7 370 404	89.6	2100.0
1989	1 581	1 353	722 842	6 607 461	7 230 303	90.0	1 980.4
1990	1 583	1 430	737 762	6 570 240	7 308 002	89.9	2 021.3
TOTAL	--	--	27 859 042	124 928 439	152 787 481	--	--

Comparison of 1990 vs 1989 Oil Production by Field

Field	1990 m^3	1990 % of Total	1989 m^3	1989 % of Total	Change 1990/1989 increase/(decrease) m^3	Change 1990/1989 increase/(decrease) % Change
Virden	296 689.2	40.2	291 766.9	40.4	4 922.3	1.7
Waskada	195 945.0	26.6	183 877.0	25.4	12 068.0	6.6
Daly	136 698.1	18.5	143 764.4	19.9	(7 066.3)	(4.9)
South Pierson	42 879.0	5.8	31 861.3	4.4	11 017.7	34.6
Pierson	19 709.7	2.7	20 362.0	2.8	(652.3)	(3.2)
Whitewater	12 373.5	1.7	13 394.4	1.9	(1 020.9)	(7.6)
Kirkella	8 211.9	1.1	9 822.7	1.4	(1 610.8)	(16.4)
Regent	4 105.9	0.6	5 187.9	0.7	(1 082.0)	(20.8)
Tilston	3 968.7	0.5	4 673.9	0.6	(705.2)	(15.1)
Lulu Lake	2 402.7	0.3	2 966.9	0.4	(564.2)	(19.0)
Souris Hartney	2 109.6	0.3	2 090.0	0.3	19.6	0.9
Coulter	568.0	0.1	555.1	0.1	12.9	2.3
Other Areas	7 231.1	0.9	7 254.1	1.0	(23.0)	(0.3)
Confidential Wells	4 870.1	0.7	5 243.7	0.7	(373.6)	(7.1)
Total	**737 762.5**	**100.0**	**722 820.3**	**100.0**	**14 942.2**	**2.1**

Disposition of Manitoba Produced Crude Oil 1951-1990 (m^3)*

Year	Manitoba**	Ontario	Quebec	USA	Total
1951-1959		Data Not Available			
1960	371 732	321 440	-	79 611	772 783
1961	148 029	573 637	-	-	721 666
1962	74 471	558 567	-	6 420	639 458
1963	94 452	533 598	-	-	628 050
1964	164 326	539 152	-	-	703 478
1965	82 651	701 955	-	-	784 606
1966	22 572	564 797	-	263 011	850 380
1967	27 417	416 097	-	476 577	920 091
1968	30 180	455 207	-	524 570	1 009 957
1969	31 323	620 216	-	351 918	1 003 457
1970	30 011	408 452	-	515 769	954 232
1971	24 539	388 389	-	490 412	903 340
1972	24 270	378 571	-	465 552	868 393
1973	273 687	95 745	-	455 093	824 525
1974	449 887	60 934	-	252 605	763 426
1975	383 383	312 397	-	12 596	708 376
1976	82 747	535 162	-	34 356	652 265
1977	21 877	609 298	-	41 309	672 484
1978	53 162	552 889	-	40 450	646 501
1979	33 258	549 524	-	48 261	631 043
1980	92 921	444 319	19 026	55 378	611 644
1981	180 402	189 659	150 177	57 702	577 940
1982	-	331 564	371 331	57 465	760 360
1983	81 887	258 611	380 911	71 544	792 953
1984	-	550 489	198 168	90 874	839 531
1985	-	245 364	483 508	211 331	940 203
1986	-	300 446	175 962	499 997	976 405
1987	-	349 807	113 418	464 806	928 031
1988	-	276 170	187 639	470 401	934 210
1989		428 731	178 744	272 305	879 779
1990	-	430 792	11 704	425 106	867 602
Total	**2 779 184**	**12 981 979**	**2 270 588**	**6 735 419**	**24 767 169**

* Includes some oil produced in Saskatchewan and transported into Manitoba.

** Manitoba's last refinery (Shell St. Boniface) closed in 1983.

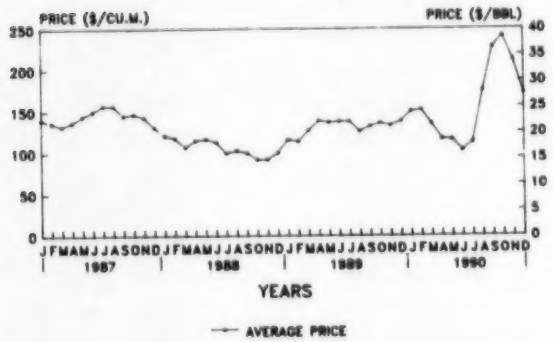
Oil Prices

Oil prices in 1990 were extremely variable. Prices were stable in January and February before declining over the period March to June. From August to October prices rose rapidly in response to Iraq's invasion of Kuwait. Security of adequate world oil supplies caused prices to decline in November and December.

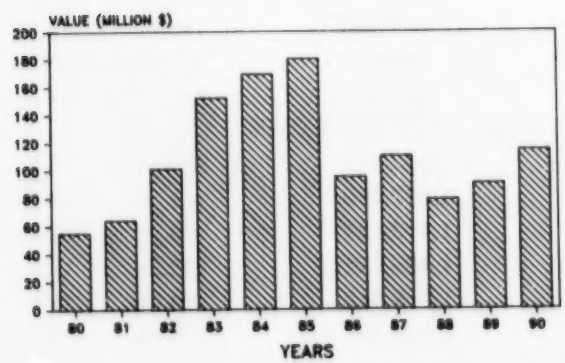
Manitoba's overall average crude oil selling price increased 25% to $155.85/m^3 ($24.78 Cdn. per barrel).The average monthly price was lowest in June at $99.16/m^3 ($15.76 Cdn. per barrel) and highest in October at $224.43/m^3 ($35.66 Cdn. per barrel).

The total value of oil production during 1990 was $114.8 million, up 27% from 1989. Increased production and higher crude oil prices in 1990 contributed to the increase in the value of production compared to 1989.

MANITOBA MONTHLY CRUDE OIL PRICES 1987-1990



VALUE OF OIL PRODUCTION IN MANITOBA 1980-1990

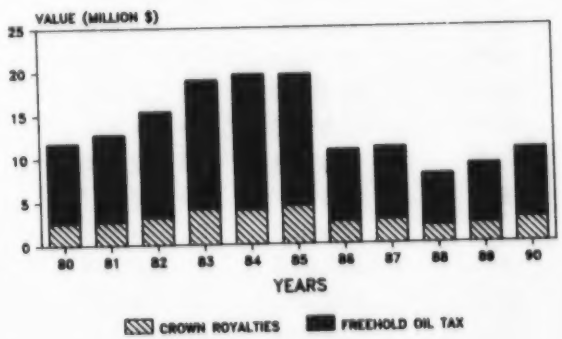


Value of Production

Provincial Revenue from Oil Production

Higher crude oil prices combined with an increase in production resulted in a increase in direct government revenues. During 1990, the Manitoba government collected approximately $11.0 million in revenues ($2.8 million in Crown oil royalties, $7.9 million in freehold oil taxes, and $0.3 million in Crown lease sale bonuses, rentals and fees), resulting in a 17% increase from 1989. These figures do not include provincial revenues in the form of corporate capital tax, sales tax, municipal tax and corporate and individual income tax.

CROWN ROYALTIES AND TAXES FROM OIL PRODUCTION 1980-1990



Manitoba Crude Oil Production and Sales Value
1951-1990

Year	Annual Production (m^3)	Cumulative Production (m^3)	Value of Sales (000's $)	Cumulative Value of Sales (Dec. 31) (000's $)	Average * Wellhead $/$m^3$	Price $/bbl
1951	1 854	1 854	26	26	15.58	2.48
1952	17 022	18 876	229	255	13.77	2.24
1953	104 193	123 069	1,715	1,970	16.51	2.62
1954	341 410	464 479	5,620	7,590	16.46	2.62
1955	658 802	1 123 281	9,517	17,107	14.56	2.31
1956	919 539	2 042 820	13,417	30,524	14.61	2.32
1957	967 721	3 010 541	15,231	45,755	15.81	2.51
1958	926 322	3 936 863	14,265	60,020	15.40	2.45
1959	803 461	4 740 324	11,615	71,635	14.46	2.30
1960	757 054	5 497 378	10,690	82,325	14.16	2.25
1961	711 969	6 209 347	10,133	92,458	14.27	2.27
1962	623 989	6 833 336	9,500	101,958	15.12	2.49
1963	599 212	7 432 548	9,183	111,141	15.33	2.44
1964	701 920	8 134 468	10,694	121,835	15.31	2.43
1965	786 050	8 920 518	12,270	134,105	15.59	2.48
1966	831 248	9 751 766	13,087	147,192	15.73	2.50
1967	887 572	10 639 338	13,974	161,166	15.77	2.51
1968	986 024	11 625 362	15,561	176,727	15.79	2.51
1969	985 981	12 611 343	15,615	192,342	15.82	2.51
1970	939 175	13 550 518	14,858	207,200	15.80	2.51
1971	890 622	14 441 140	15,445	222,645	17.31	2.75
1972	835 380	15 276 520	14,586	237,231	17.46	2.77
1973	807 882	16 084 402	17,155	254,386	21.23	3.37
1974	754 667	16 839 069	27,182	281,568	36.00	5.72
1975	701 459	17 540 528	31,453	313,021	44.81	7.12
1976	633 322	18 173 850	33,533	346,554	52.99	8.42
1977	630 466	18 804 316	40,457	387,011	64.12	10.19
1978	598 354	19 402 670	45,953	432,964	76.77	12.20
1979	583 377	19 986 047	48,403	481,367	82.97	13.19
1980	563 482	20 549 529	54,958	536,325	97.57	15.51
1981	542 695	21 092 224	64,055	600,380	118.03	18.82
1982	582 283	21 674 507	100,537	700,917	173.57	27.58
1983	736 934	22 411 441	152,350	853,267	206.64	32.84
1984	793 286	23 204 727	169,296	1,022,563	214.04	34.02
1985	820 729	24 025 456	180,049	1,202,612	220.21	35.00
1986	823 322	24 848 778	95,337	1,297,949	114.66	18.23
1987	781 795	25 629 965	109,202	1,407,151	139.76	22.21
1988	768 502	26 398 467	78,660	1,485,811	102.26	16.25
1989	722 813	27 121 280	90,101	1,575,912	124.66	19.81
1990	737 762	27 859 042	114 805	1 690 717	155.85	24.78

* Average Wellhead Price = Value of Sales / Volume Sold

Direct Revenues to Crown from Oil Exploration and Development in Manitoba[1]
1951-1990

Year	Crown Royalties ($000's)	Freehold Oil Tax ($000's)	Crown Oil & Gas Rights Revenue ($000's)	Miscellaneous Fees ($000's)	Total Direct Revenues ($000's)
1951	2	--	4	5	11
1952	7	--	7	9	23
1953	50	46	6	8	110
1954	156	64	106	24	350
1955	230	92	696	10	1,028
1956	318	83	668	18	1,087
1957	382	126	531	--	1,039
1958	356	137	293	31	817
1959	344	165	215	2	726
1960	313	130	102	2	547
1961	306	105	228	5	644
1962	298	96	116	10	520
1963	276	91	87	3	457
1964	307	86	157	23	573
1965	344	84	164	3	595
1966	353	96	154	3	606
1967	370	111	139	10	630
1968	411	116	99	14	640
1969	405	128	115	4	652
1970	377	143	43	1	564
1971	373	143	55	2	573
1972	348	138	16	1	503
1973	404	144	15	2	565
1974	1,599	5,216	15	4	6,834
1975	1,823	6,498	12	1	8,334
1976	2,024	6,128	11	11	8,174
1977	2,263	7,012	10	3	9,288
1978	2,281	8,018	10	6	10,315
1979	2,280	8,769	988	12	12,049
1980	2,575	9,159	2,012	11	13,757
1981	2,715	10,022	1,846	12	14,595
1982	3,176	11,947	1,292	28	16,443
1983	4,111	14,825	1,347	59	20,342
1984	4,238	15,642	2,466	67	22,413
1985	4,323	14,977	4,522	90	23,912
1986	2,570	8,179	1,195	53	11,997
1987	2,740	8,649	855	55	12,299
1988	2,034	5,861	639	40	8,574
1989	2,273	6,757	364	37	9,431
1990	2,578	7,662	266	35	10,541
Total	$2,333	157,645	21,866	714	232,558

1 Does not include corporate capital tax, sales tax, corporate and individual income tax or oil export tax. All figures are based on calendar year receipts.

Municipal Tax Assessments

Oil producers in Manitoba pay a municipal tax on production facilities, including: oil wells, batteries, salt water disposal wells, salt water disposal plants, water injection wells, suspended wells and pipelines.

The municipal tax assessment on these facilities for the calendar year 1990 was approximately $51.5 million dollars.

Actual tax revenue from these assessments should amount to approximately $1.8 million for affected municipalities.

Surface Owners

Prior to drilling a well, an oil company is required to negotiate a surface lease, which provides right of entry, with the landowner. The normal surface lease includes a first-year bonus payment and a subsequent annual rental fee for the duration of the lease.

Where the landowner is renting his land to another party, the oil company seeking right-of-entry must obtain the consent of both the landowner and the occupant.

After a lease has been signed, the landowner and occupant then determine what each will receive as his share of the compensation paid by the oil company.

An estimated $3.5 million was paid by oil companies to landowners in the form of first-year bonuses ($0.5 million) and annual rental fees ($3.0 million).

Following proclamation of The Surface Rights Act on August 9, 1984, disputes relating to right-of-entry or compensation are referred to the Surface Rights Board. The Board's principal function is to arbitrate disputes between the petroleum industry and landowners regarding use of land for exploration, development and related operations and to determine what compensation should be paid to the landowner.

The Minister of Rural Development is responsible for the administration of The Surface Rights Act. The Board's office is located in Winnipeg.

Spills and Reclamation

Accidental spills of oil and salt water occasionally result from oil industry operations. Regulations require soil damaged by oil and salt water spills to be fully reclaimed by the responsible operator. Sites used for wells or other production facilities must also be fully reclaimed when the well or facility is abandoned.

In 1990, 84 spills involving a total volume of 920.7 m^3 occurred. The volume of fluid spilled is equal to 0.012 percent of the total volume of oil and salt water produced.

Reclamation activities by industry resulted in 130 spill sites and 110 abandoned wellsites achieving full reclamation in 1990. In addition, 243 spill sites and 68 abandoned wellsites require further reclamation. The total area requiring further reclamation is estimated at 17 hectares (42.5 acres).

Waskada Gas Plant

During 1989 the Waskada gas plant, now in its seventh year of production, processed 15 118.1 10^3m^3 of raw gas or approximately 49% of capacity (capacity = 85 10^3 m^3/day). This resulted in the recovery of 8 687.5 m^3 of propane, butane and condensate, valued at approximately $590,000. Compared with 1989, volumes in 1990 increased by 8%. Of the total 8 687.5 m^3 produced, propane accounted for 53%, butane 21% and condensate 26%.

Manitoba Drilling Incentive Program (1979 - 1986)

The original "Manitoba Drilling Incentive Program" provided for reduced Crown oil royalty and freehold oil tax rates on oil produced from new wells. Wells drilled between January 1, 1979 and January 1, 1987, and producing from Crown mineral rights qualified for a special reduced royalty incentive rate which was 35% of the corresponding base royalty rate charged on "old oil".

New wells producing from freehold mineral rights were eligible for a corresponding incentive freehold oil tax rate under The Oil and Gas Production Tax Act.

The reduced royalty and tax rates applied to production from a new oil well during its respective "incentive period".

The incentive period earned for wells producing from provincial Crown mineral rights was called a "royalty incentive period" (RIP) whereas wells producing from freehold mineral rights earned a "production incentive period" (PIP).

As of December 31, 1990, 22 of the 1 583 wells capable of producing oil in the Province were operating under a drilling incentive period.

It is estimated that since the program was implemented in 1979, the value of the incentive to industry has been in excess of $15.0 million.

The Drilling Incentive Program expired on December 31, 1986.

Manitoba Drilling Incentive Program (1987 - 1991)

The "new" Manitoba Drilling Incentive Program announced March 2, 1987 (effective January 1, 1987) replaces the previous program which expired on December 31, 1986. The new program provides greater incentives for drilling exploratory wells while also assisting development drilling.

With the new program, qualifying wells are provided with a royalty/tax free "holiday volume". The amount of "holiday volume" varies in response to oil prices and is dependent on the well's location, depth, producing formation and qualifying credits from previous dry holes. This represents a significant improvement over the previous program which provided operators with reduced royalty/tax rates for a period of time dependent only on well depth.

Each new oil well drilled in Manitoba after January 1, 1987, and prior to January 1, 1992, can earn a "holiday volume" of oil up to a maximum of 10 000 m^3 or 5 years of producion, whichever occurs first.

Since the inception of the program 245 wells have qualified to receive holiday oil volumes. The average volume awarded per well has been 1 702 m^3. One hundred and sixteen of the wells in the program have produced the holiday volume granted and are now considered to be "new oil" for royalty and tax purposes.

Enhanced Oil Recovery Incentive Program

An Enhanced Oil Recovery Incentive Program was established in 1987. The program works in the following manner: wells in new or enlarged enhanced oil recovery projects, approved after January 1, 1987, and fully implemented prior to January 1, 1992, are eligible for an incentive period of up to 60 months. During this time, operators benefit from reduced Crown royalty and tax rates on production from the projects.

Five enhanced oil recovery projects involving 77 tracts have received incentive periods under the program.

Oil Reserves

Established oil reserve additions ae directly related to drilling activity. During the 1970's drilling activity was limited and annual reserve additions did not keep pace with production. As a result, remaining established reserves declined.

The extensive driling activity in the early 1980's resulted in increases in remaining established reserves, particularly in the Waskada and Daly Fields. With the collapse of oil prices in 1986, development drilling activity dropped and the annual decline in remaining reserves resumed.

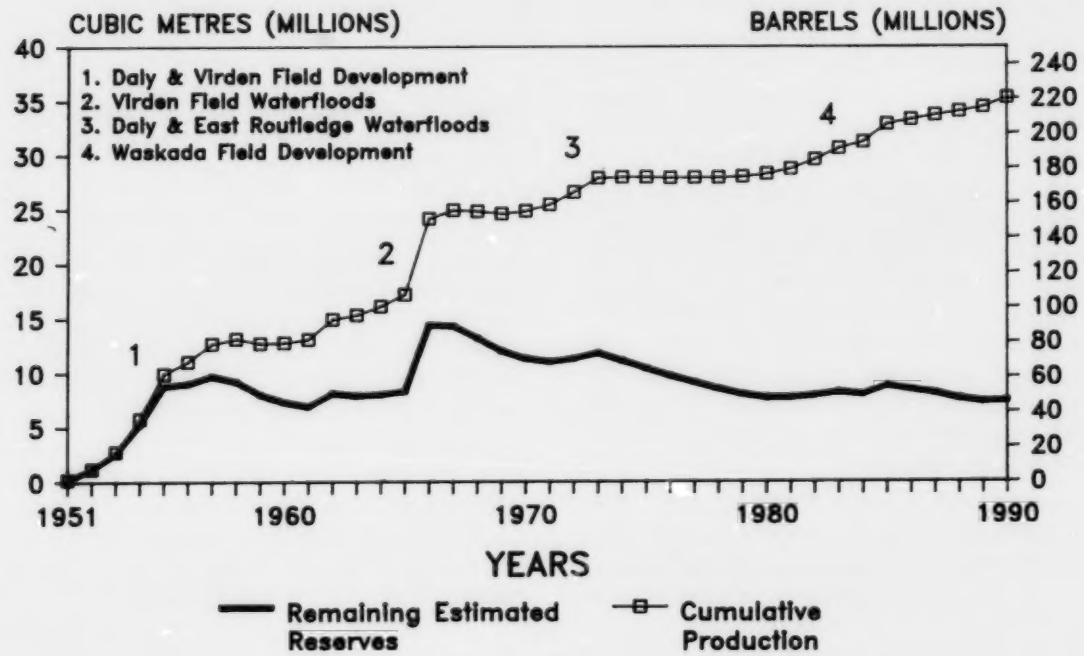
In 1990, successful development drilling and projects resulted in 865 600 m^3 of additions to established reserves. As of December 31, 1990, the province's total remaining established oil reserves are estimated at 7.41 million cubic metres (46.6 million barrels) up 1.8% from 1989.

Crude Oil Reserves in Manitoba
1973-1990

Year	Production (m^3)	Established Reserve Additions (m^3)	Remaining Established Reserves (m^3)	Life Index*
1973	807 882	Nil	11 798 000	14.60
1974	754 667	15 000	11 059 000	14.65
1975	701 459	4 000	10 362 000	14.77
1976	633 322	7 000	9 735 000	15.37
1977	630 466	15 000	9 120 000	14.46
1978	598 354	22 000	8 543 000	14.28
1979	583 377	24 000	7 984 000	13.64
1980	563 482	314 000	7 735 000	13.73
1981	542 695	544 000	7 736 000	14.25
1982	582 322	733 000	7 927 000	13.60
1983	736 934	954 000	8 154 000	11.06
1984	793 284	663 000	8 024 000	10.11
1985	820 729	1 628 000	8 831 000	10.76
1986	823 322	439 000	8 447 000	10.26
1987	781 806	401 000	8 066 000	10.32
1988	768 563	343 000	7 650 000	9.95
1989	722 820	353 000	7 284 000	10.08
1990	737 762	865 600	7 412 000	10.05

*Remaining Established Reserves divided by Annual Production

MANITOBA ESTABLISHED OIL RESERVES (HISTORY) 1951-1990



Petroleum Industry Employment

Direct employment in the petroleum industry during 1990 was approximately 250 person years, about the same level as 1989. Of this total, approximately 10 percent is attributed to geophysical and drilling activity, while the remaining 90 percent is associated ongoing operation and maintenance of existing facilities.

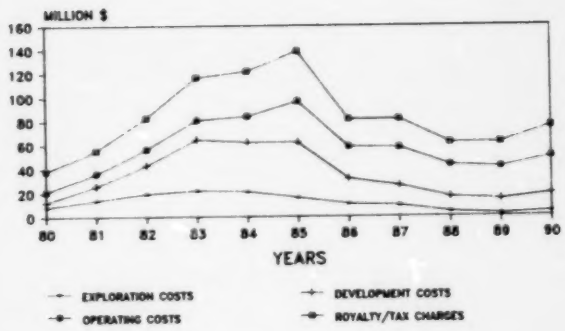
In addition, there are indirect jobs created as a result of petroleum industry activity. For every direct job in the petroleum industry it is estimated that 1 to 1.5 indirect jobs are created. This results in another 250-375 person years of indirect employment.

Industry Expenditures

As a result of increased oil prices and higher levels of oil patch activity in Manitoba during 1990, it is estimated that industry spent $76 million in the province compared with $62 million in 1989. The total expenditures can be broken down into eight categories: exploration, development, land, producing facilities, producing costs, royalties, abandonment and reclamation, and other costs.

- The exploration component, which includes, exploratory drilling costs, geophysical and geological work, amounted to approximately $3.9 million.
- Development costs include development drilling costs, which accounted for approximately $15.2 million.
- Land costs were based on freehold and Crown mineral and surface rights acquisition costs, fees and rentals. The total estimated cost of this component amounted to $4.0 million.
- Producing facilities included mainly capital costs associated with field equipment and enhanced recovery schemes. Approximately $1.8 million were spent on this component.
- Production costs were valued at $25.0 million and include well operating, flow line and gas plant costs.
- Royalties including freehold production royalties, Crown production royalties and freehold oil taxes, are estimated at appoximately $23.3 million for 1990.
- Costs associated with abandonment of wells and reclamation of sites damaged by oil field operations totalled approximaely $0.4 million.
- Other costs in total industry expenditure include municipal taxes, right-of-way acquisitions and miscellaneous expenditures, totalling approximately $2.4 million.

PETROLEUM INDUSTRY EXPENDITURES IN MANITOBA 1980-1990



1991 Forecast

Petroleum exploration activity in Manitoba is expected to remain at relatively low levels.

Crown land sales are expected to generate $0.1 - $0.3 million compared with the 1990 figure of $0.16 million.

It is not expected that more than five geophysical programs will be conducted in 1991.

In the first quarter of 1991, drilling activity has been relatively high. Development drilling is expected to continue at a somewhat lower level during the rest of the year. Activity will continue to be concentrated in the Pierson, Waskada and Daly Fields.

It is anticipated that 65 to 80 wells will be drilled.

It is likely that at least two horizontal wells will be drilled in Manitoba in 1991. Application of this technology is stimulated by ongoing success of horizontal wells in southeastern Saskatchewan and by Manitoba's horizontal well incentive program.

It is anticipated that a number of new or expanded pressure maintenance projects, notably in the Waskada Field, will be initiated during 1991.

Based on the anticipated level of drilling and pressure maintenance activity, crude oil production is expected to decline slightly to 725 000 m^3 compared with 737 762 m^3 in 1990.

Crude oil prices in Manitoba are expected to fluctuate in the range of $110/$m^3$ to $150/$m^3$ ($17.48 Cdn. per barrel to $23.85 Cdn. per barrel) and average approximately $120/$m^3$ ($19.20 Cdn. per barrel) down from $155.85/$m^3$ ($24.78 Cdn. per barrel) in 1990.

The total value of oil production is forecast to be approximately $87 million.

Direct revenues to the Crown are expected to total approximately $8.2 million ($2.1 million in royalties and $6.1 million in freehold production taxes).

Manitoba Oil Fields - 1990

	Daly	Tilston	Waskada	Lulu Lake	Virden	White-Water	Pierson*	Kirkella	Souris Hartney	Coulter	Regent	Other Areas	Conf. Wells	Total
Discovery Year	1951	1952	1952	1953	1953	1953	1954	1957	1962	1952	1955	--	--	--
Avg. Depth to Producing Formation (m)	822	940	918	1 005	634	782	1 003	734	655	968	767	858	--	--
Producing Formation	L/B	MC	MC/LAm	L	L	LAm/L	MC/LAm	L	L	MC/LAm	L	LAm MC/L	--	--
Well Spacing (ha)	16/8	16	16/4	16	16/8	16	16/32	16	32	16	16	16	--	--
Active Oil Wells 1990	374	16	375	7	554	26	95	27	6	5	10	16	16	1 527
1990 Oil Prod. (m^3)	136 698	3 969	196 272	2 403	296 689	12 374	62 683	8 212	2 110	568	4 106	7 231	4 544	737 762
Cum. Oil Prod. (Dec. 31, 1990) (m^3)	4 596 053	125 316	2 055 123	62 592	19 776 143	190 661	558 982	261 024	141 740	12 103	28 935	45 826	4 544	27 859 042
Remaining Established Reserves(m^3) (Dec. 31, 1990) (000's m^3)	1 143.9	13.5	1 941.8	12.9	3 596.6	65.0	537.2	25.5	15.7	0.6	6.7	20.2	32.4	7412.0

L = Lodgepole
LAm = Lower Amaranth
MC = Mission Canyon
B = Bakken

* Pierson and South Pierson Fields amalgamated as Pierson Field, January 1991.

GEOLOGICAL FORMATIONS IN MANITOBA

AGE Millions of years before present	ERA	PERIOD	EPOCH	FORMATION	MEMBER	MAX THICK (m)	BASIC LITHOLOGY
	CENOZOIC	QUATERNARY	RECENT				TOP SOIL DUNE SANDS
			PLEISTOCENE	GLACIAL DRIFT		140	CLAY SAND GRAVEL BOULDERS PEAT
		TERTIARY	PLIOCENE				
			MIOCENE				
			OLIGOCENE				
50			EOCENE				
			PALEOCENE	TURTLE MTN	PEACE GARDEN	120	SHALE CLAY AND SAND LIGNITE BEDS LOCATED ONLY IN TURTLE MOUNTAIN
65					WOODLANDS		
	MESOZOIC	CRETACEOUS	UPPER CRETACEOUS	BOISSEVAIN		30	SAND AND SANDSTONE GREENISH GREY LOCATED ONLY IN TURTLE MOUNTAIN
				RIDING MTN	[illegible]	310	GREY SHALES—NON-CALC LOCAL IRONSTONE BENTONITE NEAR BASE GAS FOUND
				VERMILION RIVER	PENSHAW	150	SHALE DARK GREY CARBONACEOUS NON-CAL BENTONITE BANDS
					BOYNE		SHALE GREY SPECKLED CALC BENTONITIC SLIGHTLY PETROLIFEROUS
					MORDEN		SHALE DARK GREY NON-CALC CONCRETIONS LOCAL AND SILT
				FAVEL		40	GREY SHALE WITH HEAVY CALCAREOUS SPECKS BANDS LIMESTONE AND BENTONITE
100				ASHVILLE		115	SHALE DARK GREY NON-CALC SILTY
			LOWER CRETACEOUS	ASHVILLE SAND			SAND ZONE 27m F G QTZ S OR SS
				SWAN RIVER		75	SANDSTONE AND SAND QTZ PYRITIC SHALE—GREY NON-CALC
150		JURASSIC	UPPER JURASSIC	WASKADA		200	BANDED GREEN SHALE AND CALC SANDSTONE
				MELITA			BANDS OF LIMESTONE VARI-COLORED SHALE
			MIDDLE JURASSIC	RESTON		45	LIMESTONE BUFF AND SHALES GREY
				AMARANTH	UPPER EVAPORITE	45	WHITE ANHYDRITE AND/OR GYPSUM AND BANDED DOLOMITE AND SHALE
200					LOWER RED BEDS	40	RED SHALE TO SALTSTONE DOLOMITIC **OIL PRODUCING**
		TRIASSIC					
250	PALEOZOIC	PERMIAN	(?)	ST MARTIN COMPLEX		300	CARBONATE BRECCIA TRACHYANDESITE (CRYPTO-EXPLOSION STRUCTURE)
		PENNSYLVANIAN					
300		MISSISSIPPIAN		MADISON GROUP — CHARLES		31	MASSIVE ANHYDRITE AND DOLOMITE
				MISSION CANYON	MC-3	170	LIMESTONE—LIGHT BUFF OOLITIC FOSS FRAG CHERTY BANDS SHALE AND ANHYDRITE **OIL PRODUCING**
					MC-2		
					MC-1		
				LODGEPOLE	FLOSSIE LAKE	105	LIMESTONE & ARG LIMESTONE LIGHT BROWN AND REDDISH MOTTLED ZONES OF SHALEY OOLITIC CRINOIDAL & CHERTY **OIL PRODUCING**
					WATERHEN LAKE		
					VIRDEN		
					[illegible]		
350				BAKKEN	UPPER	30	2 BLACK SHALE ZONES SEPARATED BY SALTSTONE **OIL PRODUCING**
					MIDDLE		
					LOWER		
		DEVONIAN		[illegible]	LYLETON	30	RED SILTSTONE AND SHALE DOLOMITIC
				SASK GROUP	NISKU	40	LIMESTONE & DOLOMITE YELLOW-GREY FOSS POROUS SOME ANHYD
					DUPEROW	170	LIMESTONE & DOLOMITE ARG & ANHYDRITIC IN PLACES
				MANITOBA GROUP	SOURIS RIVER 1 ST RED	120	CYCLICAL SHALE LIMESTONE & DOLOMITE ANHYDRITE
					DAWSON BAY 2 ND RED	60	LIMESTONE & DOLOMITE POROUS ANHYDRITE—LOCAL SHALE RED & GREEN
				ELK POINT GROUP	PRAIRIE EVAP	130	SALT POTASH & ANHYDRITE DOLOMITE INTER—BEDDED
					WINNIPEGOSIS	75	DOLOMITE LIGHT YELLOWISH BROWN REEFY
400					ELM POINT		LIMESTONE—FOSS HIGH CALCIUM
					ASHERN	12	DOLOMITE AND SHALE—BRICK RED
		SILURIAN		INTERLAKE GROUP		130	DOLOMITE YELLOWISH—ORANGE TO GREYISH—YELLOW FOSS SILTY ZONES
		ORDOVICIAN		STONEWALL		15	DOLOSTONE GREYISH YELLOW BEDDED
				STONY MOUNTAIN	WILLIAMS	30	DOLOMITE—YELLOWISH—GREY SHALEY
					GUNTON		
					PENITENTIARY		DOLOMITE—SHALEY—YELLOW FOSS
					GUNN	20	SHALE RED—GREEN FOSS LIMESTONE BANDS
450				RED RIVER	STONY MOUNTAIN	170	DOLOMITIC LIMESTONE MOTTLED AND DOLOMITE
					SELKIRK		
					CATHEDRAL		
					ROSE HEAD		
				WINNIPEG	UPPER UNIT	60	SHALE GREEN WAXY SANDSTONE INTERBEDDED
500					SANDSTONE		SAND SANDSTONE QUARTZOSE
550		CAMBRIAN		DEADWOOD		60	SAND BLACK TO GREEN—GREY WAXY GLAUCONITIC SILTSTONE & SHALE GREEN—GREY TO BLACK VERY EDGE OF S IN MANITOBA ONLY
	PRECAMBRIAN						ACID & BASIC CRYSTALLINES & METAMORPHICS